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Case No. U-16129

At the expiration of the period for filing exceptions, an Order of the Commission will be issued in conformity with the attached Proposal for Decision and will become effective unless exceptions are filed seasonably or unless the Proposal for Decision is reviewed by action of the Commission. To be seasonably filed, exceptions must reach the Commission on or before the date they are due.

MICHIGAN ADMINISTRATIVE HEARING  
SYSTEM  
For the Michigan Public Service Commission

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Theresa A. Sheets  
Administrative Law Judge

October 17, 2011  
Lansing, Michigan

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Case No. U-16129

<sup>1</sup> This was not the first time the Complainants had expressed concern over possible stray voltage on their farm. On February 20, 2006, Complainants contacted the Agricultural Services Department office requesting to have the farm checked for stray voltage. 4 Tr 300. Consumers

In response to the Tensens' informal complaint, Consumers met with Mr. Tensen on March 24, 2008.<sup>2</sup> 4 Tr 273; Staff's Initial Brief, p 6. At that time, Consumers conducted some short duration voltage measurements using a handheld device (spot checks) to measure animal contact voltage or "stray voltage."<sup>3</sup> *Id.* The spot checks demonstrated that the preventative action level which would require action by Consumers to mitigate animal contact current was not met.<sup>4</sup> No further action was taken by Consumers relative to Tensens' informal complaint.

After the spot checks were completed pursuant to R 460.2702(1), the Tensens requested no additional services or testing until August 14, 2008, when Tensens filed a formal complaint with the MPSC initiating additional procedures in the Rules and Regulations Governing Animal Contact Current Mitigation (Stray Voltage Rules), R 460.2701 et seq. (the Rules). Staff's Initial Brief, p 6; 4 Tr 273; Consumer's Initial Brief, p 4. At that time, unsatisfied with the spot check results, Tensens requested the lengthier 72 hour stray voltage measurements to be taken pursuant to R 460.2702(2). Consumers was scheduled to conduct the 72-hour measurements from August 19, 2008, through August 22, 2008. 4 Tr 273.

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Energy responded by visiting the farm. *Id.* "No voltage levels of concern were measured and the separation [separation of neutrals installed on December 10, 1992, as modified] was found to be effective. 4 Tr 300; Exhibit CE -19, pp 35-37. This complaint and testing was done prior to the enactment of R 460.2701 et seq., the current rules governing animal contact current mitigation.

<sup>2</sup> The record is unclear if Consumers' representative met with the complainant, Nicholaas Tensen, V, or his son, and any reference to "Mr. Tensen" throughout the record lacks clarity with regard to whether said reference is to the Complainant or his son.

<sup>3</sup> This was required pursuant to R 460.2702(1).

<sup>4</sup> When Consumers met with Complainants on March 4, 2008, Complainants had installed an EGS (Electrical Grounding System – also called a compensating amplifier) which, along with additional grounding, can be used to minimize current on the customer's secondary wiring on the farm. 2 Tr 301. Voltage readings were taken with and without the farm's EGS system turned on. *Id.* The vacuum pump was also turned on and off while readings were taken. *Id.* The separation of neutrals was found to be effective. *Id.*; Exhibit CE-19, p 40.

Prior to Consumers' scheduled 72-hour testing, Tensens retained a third party, Fred Thiel, consultant and owner of Stray Voltage Research and Control, a stray voltage consulting business, to conduct a 72-hour test to measure animal contact voltage on the Tensen Farm. Staff's Initial Brief, p 7. Those measurements were taken between July 31, 2008, and August 3, 2008. *Id.* Mr. Thiel did not follow the protocol set forth in R 460.2702 as it relates to measuring animal contact voltage and, further, Mr. Thiel's testing did not demonstrate stray voltage above the preventative action level as set forth in R 460.2701 et seq. Exhibit CE-24, pp 33, 48, 50; 4 Tr 288-289; Staff's Initial Brief, p 7.

Thereafter, between August 19, 2008, and August 22, 2008, Consumers' Agricultural Services Director, Steven L. Wallenwine, led a team that conducted the 72-hour test pursuant to R 460.2702(2). 4 Tr 301-302. While conducting the tests, three individuals were also present and observed the testing: (1) Mr. Tensen, (2) Dr. Donald Hillman, and (3) George Orphan.<sup>5</sup> No stray voltage above the preventative action level was established. 4 T 305; Exhibit CE-20. Staff reviewed the test results of Mr. Wallenwine and agreed with his analysis and testing. 4 Tr 276-277. Because Consumers did not record stray voltage above the preventative action level established in the Rules, Consumers did not take further action at that time. 4 Tr 305; 4 Tr 276-277; Exhibit CE-20.

Dissatisfied with the results of the Consumers' testing, pursuant to R 460.2704, Tensens then requested that the Staff arrange for further investigation by Commission-

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<sup>5</sup> Dr. Donald Hillman is a retired professor from Michigan State University with his PhD in Dairy Nutrition, Bio-Chemistry, Physiology, and Agricultural Economics. George Orphan is an Electrical Engineer and a Professional Electrician who is president of Geotech, Inc. in Grand Rapids, Michigan. 4 Tr 301. The record is, again, unclear whether Complainant or his son was present during the testing.

appointed experts.<sup>6</sup> Consumers' Initial Brief, p 5. In an effort to establish a panel, Staff made recommendations that were rejected by the Tensens and the Tensens made recommendations that were rejected by Staff. Exhibits CE-4, CE-6, CE-7, CE-8. Ultimately, the Commission appointed a panel of five experts on September 15, 2009. 4 Tr 278; See also Exhibit CE-11. Those experts were James H. Worden, a licensed Master Electrician; Dr. Roger Mellenberger, instructor and agricultural extension specialist; Dr. Pamela Ruegg, licensed veterinarian and board certified specialist in dairy practice, Dr. Douglas J. Reinemann, agricultural engineer; and George J. Orphan, Professional Engineer and Electrical Engineer.

On September 17, 2009, two days after the Commission appointed the five-expert panel, Mr. Wallenwine, conducted a routine maintenance inspection of Tensen Farm. Exhibit CE-12. Mr. Wallenwine, as a follow-up to his inspection, sent correspondence to Tensens dated September 23, 2009, indicating that, through the inspection, he "discovered . . . that the primary grounding conductor had been disconnected at the transformer pole." *Id.* His correspondence continued by explaining the safety concerns that exist over the disconnection, indicating that code requires the grounds to be in place, and warning that "further" alteration of safety equipment could result in action by Consumers, including damages and discontinuation of electric service. *Id.* According to the correspondence, "[f]ollowing the repairs on September 22, 2009 testing was conducted to verify the proper operation of the isolated neutral system currently installed" on Tensen Farm.

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<sup>6</sup> This request was made approximately 1 year after Consumers' 72-hour testing had been conducted.

The five experts conducted their investigations and filed their reports (Worden 11/20/09, Mellenberger 12/30/09, Ruegg 1/4/10, Orphan 1/4/10 and Reinemann 1/5/10). Each of the experts on this panel evaluated various aspects/conditions of Tensen Farm, based on his/her respective expertise. Exhibits COM-1, COM-2, COM-3, COM-4 and COM-5.

On March 3, 2010, after the Commission-appointed experts submitted their reports, Tensens filed a Formal Complaint Requesting Initiation of Proceeding against Consumers (Complaint) with the MPSC. Tensens' Complaint alleged negligence by Consumers resulting in reduced milk production and, in support of its Complaint, attached the report of George J. Orphan thereto. The Complaint requested mitigation action by Consumers as specifically recommended and outlined in the report of Mr. Orphan, economic damages (including reasonable attorney fees), and other relief.

Administrative Law Judge Daniel E. Nickerson, Jr. (ALJ Nickerson) held a prehearing conference on April 27, 2010. Counsel for Complainants, Consumers and Staff participated in the proceedings. No petitions to intervene were filed and, thus, none were granted.

An evidentiary hearing was conducted before ALJ Nickerson on May 26, 2010, during which George J. Orphan, one member of the expert panel appointed by the Commission, was cross-examined and 16 exhibits were received into evidence (Exhibits COM-1 through COM-5, Exhibit CE-1, CE-2, CE-4, CE-6 through CE-8, CE-11, CE-12, and CE-14 through CE-16). Further evidentiary proceedings were held before ALJ Nickerson on May 27, 2010, during which George J. Orphan, Dr. Douglas J. Reinemann, and James Worden, three of the expert panel appointed by the

Commission, were cross-examined and Exhibit TTF-1 was received into evidence. During the course of the cross-examination, counsel for Tensens made an oral motion to restrict the hearing to electrical issues and the issue of whether the voltage levels rose to the preventative action level as defined by the rules of the PSC, and that any animal health issues not be addressed in this proceeding since they would be irrelevant to the proceedings. 3 Tr 171-173. ALJ Nickerson advised that the matter should be addressed in the form of a written motion and addressed before the next date scheduled for testimony. 3 Tr 173. ALJ Nickerson also noted on the record that if counsel believed evidence was objectionable, that an objection should be raised at the appropriate time and that a ruling would be based on the specific circumstances before him. 3 Tr 173-174. No written motion was ever filed.

On October 20, 2010, Consumers filed a Motion to Compel Electrical Testing and brief in support of its motion. In its Motion, Consumers requested the opportunity to gain reasonable access to the Tensen Farm to allow another expert, Charles Forster, an electrical engineer, to verify and/or duplicate the testing conducted by Mr. Fred Thiel, as Mr. Thiel's testimony was being relied upon by Tensens. In the alternative, Consumers requested that Mr. Thiel's testimony be barred. On December 8, 2010, the parties entered a Stipulation and Agreement whereby they agreed that on December 13, 2010, Charles Forster and Fred Thiel, with the technical assistance of Consumers staff, would jointly conduct additional testing, with all parties being able to participate/observe. The Stipulation provided that the 72- hour test would be conducted pursuant to the Stray Voltage Rules and that no party would object to admission of the results into evidence.



On December 14, 2010, this matter was reassigned to Administrative Law Judge Theresa A. Sheets (ALJ Sheets).

On February 8, 2011, Consumers conducted the deposition of Fred Thiel. See Exhibit CE-24.

On April 11, 2011, Staff and Consumers each filed Motions to Strike certain prefiled direct testimony and exhibits of Mr. Fred Thiel and Gerald Bodman.

The final day of evidentiary hearings was held before ALJ Sheets on April 25, 2011. At that time, certain portions of prefiled direct testimony of Fred Thiel were stricken,<sup>7</sup> certain portions of the prefiled direct testimony of Gerald Bodman<sup>8</sup> were stricken, and certain portions of the Gerald Bodman's report were also stricken. At that time, the testimony of Peter J. Derkos, Steven L. Wallenwine, Charles G. Forster and Gerald R. Bodman (except those portions stricken) were bound into the record. Twelve exhibits (as redacted pursuant to the motion to strike) were admitted into evidence (Exhibits CE-18 through CE-27, document number 65 on the e-docket and document number 57 (as redacted) on the e-docket). Dr. Donald Hillman withdrew his late petition to intervene and gave an oral Rule 207 statement at the conclusion of the hearing.

The record in this case consists of 391 pages of transcript and 29 exhibits. Staff, Tensens and Consumers filed initial brief on May 25, 2011, and reply briefs on June 15, 2011.

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<sup>7</sup> Although portions of Fred Thiel's prefiled direct testimony were stricken, counsel for Tensens did not move for the remaining testimony to be bound into the record. Mr. Thiel's deposition testimony, however, became part of the record as Exhibit CE-24 which was admitted into evidence.

<sup>8</sup> Gerald R. Bodman is a consulting engineer who serves as a consultant in the general area of farmstead engineering. 4 Tr 344. He also operates a dairy beef, dairy heifer, and hay production farm. *Id.* He owns Agricultural Systems Engineering, a consulting business located in Bloomburg, Pennsylvania. *Id.*

## II.

### **REPORTS AND TESTIMONY BASED ON INVESTIGATIONS BY 5 PANEL MEMBERS APPOINTED BY COMMISSION**

#### A. James H. Worden

James H. Worden, a licensed Master Electrician and one of the five experts appointed by the Commission to evaluate the claims of Complainants, conducted a survey of the electrical system of the Tensen Farm on October 30, 2009. The results of his report are set forth in Exhibit COM-4 submitted to the Commission on November 20, 2009.

According to Mr. Worden's report, he conducted a "nondestructive visual inspection" of the farm. Exhibit COM-4, p1. Mr. Worden testified that he "inspected the farm [], as an electrical inspector in the State of Michigan." 3 Tr 240. Mr. Worden testified that he did not inspect Consumers' utility lines, except to the extent that he made an observation that the lines physically existed. 3 Tr 239. Mr. Worden explained that his role in the investigation process was that of an electrical inspector; thus, making an inspection of Consumers' equipment and lines outside of his jurisdiction. 3 Tr 239-240. Mr. Worden's report is comprised of information related to areas on the farm that did not comply with the minimum requirements of the National Electric Code, and includes photographs in support of his observations. Exhibit COM-4.

Mr. Worden testified that although he found numerous items of electrical code non-compliance, which are set forth in his report, he could not and did not give an opinion as to whether there is any correlation between those areas of non-compliance and the allegations of stray voltage because he did not do any testing to make such a

determination. 3 Tr 237-238; See also Exhibit COM-4. Ultimately, Mr. Worden's report cites, with supporting photographs, several areas of noncompliance of the minimum requirements of the National Electric Code on Tensens' farm. Exhibit COM-4. In his report, Mr. Worden also notes "lack of concerned maintenance" of older installations "that has allowed the systems to deteriorate to their present condition." Exhibit COM-4, p 11. While Mr. Worden's report indicates that "[t]he new service installation by the milk parlor appears to meet requirements of the code," his final summary indicates that "[t]he lack of proper maintenance and the improper bonding and grounding have affected the integrity of the electrical system." *Id.*

B. Dr. Roger Mellenberger

Dr. Roger Mellenberger, a consultant with RWM Dairy Consulting, was also appointed by the Commission to investigate Tensens' claims. Dr. Mellenberger visited Tensen Farm on October 30, and 31, 2009, and on November 17, 2009, as part of his investigation. Exhibit COM-3. Dr. Mellenberger submitted his report to the Commission on December 28, 2009.

1. Summary of Concerns Provided by Tensens

The only detailed information in the record in this matter which articulates the Tensens' observations and concerns is a document provided by the Tensens to Dr. Mellenberger on October 30, 2009, and is incorporated in and made part of Exhibit COM-3, pp 9-18 (Tensen Summary). The Tensen Summary appears to be authored by Nick Tensen, son of Complainants, Nicholaas Tensen, V, and Geraldine Tensen. In the Tensen Summary, Tensens outline all of the actions they have taken to address

problems related to decreased milk production they were experiencing with the dairy farm. The document also includes a list of professionals consulted and utilized for a variety of matters from veterinarian health checks to installation of a new milking parlor. See Exhibit COM-3, pp 8-13.

In support of Tensens' position that stray voltage is a problem on their farm, Tensens point to a series of observations, including: (1) a farm employee getting a shock from a hanging chain, (2) vibrating utility poles, (3) noise readings on a machine used to determine if grounding rods are installed and working correctly, (4) lack of long-term life of light bulbs and appliances, and (5) cow behaviors. Exhibit COM-3, pp 14-15. "Cow behaviors" of concern included failure of cows to get pregnant (using bulls and artificial insemination), inability of professional breeding to establish a rate of conception above 21% (when average for a professional breeder is over 45%), increased percentage of calf deaths (from less than 1% to over 18%), cows drinking urine even after salt in diet was increased, cows traveling past three different water tubs to drink from a tub a distance away from the barns, cows constantly mooing, cows lapping water like dogs, cows refusing to come to the barns to eat, cows requiring physical prodding to get into the milking parlor - and dancing and kicking while being milked, and other activities that led Tensens to believe that the cows were uncomfortable. Exhibit COM-3.

Tensens indicate that they had done everything from spy on employees to make sure they were doing their jobs properly to sending some cows to slaughter to determine if there was a problem internally with the cows (and they report that no problems were found). *Id.*

Finally, in support of their claims, Tensens indicate in the Tensen Summary given to Dr. Mellenberger that the cows' behaviors improved when there were two power outages in 2008 and 2009 (within minutes the cows were in the freestalls<sup>9</sup> laying down, standing at the mangers eating, and drinking normally), and when the cows were moved to a barn and milking parlor on a farm rented from a third party (the Dys farm).<sup>10</sup> According to the Tensens, while utilizing the Dys farm, despite the Dys farm having older barns with poorer freestalls, feed bunks, water quality, and milking parlor, the cows doubled in milk within 2 months, put on weight, entered the parlor willingly, and the herd grew in size.<sup>11</sup> *Id.* Tensens note that the Dys farm "operated with the same employees, feed, and management that run our farms in Ravenna." *Id.* at 17. Tensens believe that they identified a "hot zone" which provided the most problems for his herd.

## 2. Dr. Mellenberger's Investigation and Report

Having a specific description of the Tensens' concerns in hand (in the form of the Tensen Summary), Mr. Mellenberger's examination included investigations of: (1) voltage and current at cow contact, (2) farm and dairy management, (3) nutrition, (4) feeding management, (5) molds and toxins, (6) water, (7) milking procedures, (8) milking equipment, (9) records, (10) housing, (11) reproductive management, (12) calf management, (13) herd size, and (14) financial.

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<sup>9</sup> "Freestalls" are defined as resting cubicles or "beds" in which dairy cows are free to enter and leave, as opposed to being confined in stanchions or pens. Environmental Protection Agency (EPA) Dairy Glossary.

<sup>10</sup> No evidence was presented in this matter documenting any power outages as alleged by Tensens in the Tensen Summary; thus, this allegation is unconfirmed and unsupported by the record.

<sup>11</sup> No evidence was presented in this matter documenting the alleged change in milk production at the Dys' farm; thus this allegation is unconfirmed and unsupported in the record.

According to Mr. Mellenberger, he did not focus on the electrical systems on the dairy farm but, rather, focused on possible electric cow contact points that may affect dairy cows such as “waterers, feed surfaces and milking parlor.” *Id* at 3. He stated in his report:

Current has to be 3 to 6 mA (3 to 6 volts at 1000 ohms or 1/5 to 3 volts at 500 ohms) at cow contact to affect behavior on some cows and higher than 3 to 6 mA to affect feed and/or water intake on a high percentage of cows. Current or voltage must have sufficient duration to be of significance to cows. Proper testing techniques with adequate equipment are necessary to ferret out significant current and voltage readings.

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Cow behavior is also a good measure of exposure to significant current or voltage readings. Cows widely vary in their response to current with a range of 3 to 19 mA needed to cause a response. Cows will avoid those areas of a farm that have potentially harmful current/voltage levels . . . .

Exhibit COM-3, p 3.

In his report, Dr. Mellenberger made the following conclusions:

a. Geotech (Mr. Orphan and assistant) had “no idea on how to conduct a ‘stray voltage’ investigation nor did they have the proper equipment to conduct such an investigation.” Exhibit COM-3, p 3. Because Dr. Mellenberger felt that he and Dr. Ruegg had to assist Mr. Orphan in locating potential cow contact points on a dairy farm for investigation, Dr. Reinemann had to help Mr. Orphan organize a potential testing sequence during day 2 of their visit, and because he had not seen the results of a load box test that was to be conducted by Mr. Orphan in November (or the results of any other testing), Dr. Mellenberger stated that he has “no faith that ‘stray voltage’ testing was done according to Wisconsin or Michigan PSC standards.” *Id*. Dr. Mellenberger further criticized Mr. Orphan saying that he “does not have experience to distinguish between normal and abnormal current/voltage at cow contact points.” *Id*.

b. Cow behavior was normal. Dr. Mellenberger video taped both farm visits. He noted that cows were “100% content at waterers, during feeding, entering and exiting parlor and during milking.” *Id* at 4. While he did observe some cows lapping water, he deemed it “normal behavior.” *Id* at 3-4. He found the cows to have no fear of eating feed, complicit with entering the parlor with little coaxing, still and quiet during milking (except lame cows), comfortable and using freestalls and, overall, affected only by stall design or feed bunk design and “not by any voltage or current.” *Id*.

c. Lactating cow rations (Total Mixed Rations) were too coarse, causing cows to sort the fine from the long particles, “which potentially can lead to metabolic disorders.” Exhibit COM-3, p 5.

d. Feeding mistakes in 2007 (Milk fat/protein inversions caused by excessive grain feeding compared to forage and/or a lack of fiber in forages) had an immediate effect on herd and a long term effect through cow loss and reproductive delays. *Id*. Dr. Mellenberger also noted that protein, energy and sodium levels in the feed were incorrect, recipe directions were not always followed for mixing, and feed in one of the barns had been run over by a feed truck several times during feeding, and a skid loader, not a bucket, was used to scrape alleys and deliver feed to the barns. *Id*. In the end, Dr. Mellenberger stated that “end result is a short time increase in milk production and then a disastrous run of sick cows (off feed), feet and leg problems, metabolic disorders, dead cows, poor reproductive performance, increase in veterinary expense and lower milk checks.” *Id*.

e. Easy access to quality feed was questionable in one barn as cows had to stand on a curb and eat in a raised bunk which decreases feed intake, feed was quickly

pushed out of cows' reach in another barn as cows sorted feed due to long particles, feed bunk space was limited for bred heifers<sup>12</sup> in other barns, and there was no cover over dry cows.<sup>13</sup> *Id.*

f. Mold and yeast analyses originally demonstrated elevated levels of zearalenone, a yeast count that was too high in bred heifer and lactating cow rations, and a mold count that was excessive on haylage from a pile. During Dr. Mellenberger's second visit, the mold and yeast problems had improved.

g. Water was sufficient for all lactating cows and heifers, and milking procedures were acceptable.

h. Mastitis control was a concern because of poor teat coverage with post-spraying of teat disinfectants, particularly since infected cows (with mastitis) were milked with non-infected cows.

i. Milking equipment was not being maintained.

j. Tensens stopped DHI testing in January-February 2009 and veterinary service was limited during 2009.

k. Some freestalls were not the proper size for mature cows.

l. The three barns were too close together, impeding natural ventilation and concrete front on freestalls in one barn increased risk of leg injuries.

m. Bedded pack used in freestalls or open areas for dry cows were wet and dirty, increasing risk of mastitis and other diseases for fresh cows.<sup>14</sup>

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<sup>12</sup> A "heifer" is a bovine female less than three years of age who has not borne a calf. Environmental Protection Agency (EPA) Dairy Glossary.

<sup>13</sup> A "dry cow" is defined as a cow that is not lactating or secreting milk after it has completed a lactation period following calving. Environmental Protection Agency (EPA) Dairy Glossary.



n. Slatted floors in barns used to house dry cows and young heifers were not only very dirty, but the slatted floors increased the risk of feet and leg injuries.

o. There were an insufficient number of bulls for bull breeding. Tensens reproduction program consisted on 1 bull for lactating cows (165 cows at November visit) and 1 bull (who had an abscess/growth on its jaw) for heifers (greater than 100 heifers). One bull is necessary for every 25 open cows or heifers and Tensens should have had 4 bulls at a minimum. Additionally, the bull had access to fresh cows which can lead to pregnancies too early in lactation.

p. Low number of pregnant cows and cows long days in milk in Tensen herd were related to reproductive management program and not “stray voltage.”

q. Calf losses (stillbirths and death after birth) are excessive in Tensen herd and have been for several years. Lack of a dedicated maternity area would be one possible risk factor as would dry cow nutrition.

r. Decrease in herd size has been significant over past 3 years and feeding mistakes in 2006-2007 would have contributed. Lack of money to purchase more replacements would be another reason.

Overall, Dr. Mellenberger concluded,

“stray voltage” did not and has not caused a decrease in milk production or increased health and death problems in calves and cows on the Tensen farm. Any loss of herd size, decrease in herd milk production or increase in health problems is most likely related to totality of management practices and/or management decisions or non-decisions made by Tensens . . . . In my opinion, a major reason for blaming “stray voltage” is a lack of understanding by Tensens of what is a problem and what is not; voltage/current levels, water intake, lapping water, normal behavior, etc.

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<sup>14</sup> A “fresh cow” is defined as a cow that has recently given birth to a calf. Environmental Protection Agency (EPA) Dairy Glossary.

C. Dr. Pamela L. Ruegg

Dr. Pamela L. Ruegg, a licensed veterinarian and board certified specialist in dairy practice, was also appointed by the Commission to investigate Tensens' claims. Dr. Ruegg visited Tensen Farm on October 30, and 31, 2009, as part of her investigation. Dr. Ruegg submitted her report to the Commission on December 30, 2009. Exhibit COM-5. In her investigation, Dr. Ruegg observed the herd for cow behaviors, examined milk production, obtained and tested samples to determine if disease was present, tested milk quality, tested for mastitis, examined and evaluated reproductive performance, and evaluated biosecurity.

In her report, Dr. Ruegg indicates that Nick and Kathy Tensen discussed their concerns with her about abnormal cow behavior (drinking, feeding and milking behavior), but also indicated that they felt that the behavior was not evident during the 2 days that Dr. Ruegg visited. Exhibit COM-5, p12. When Dr. Ruegg observed the cows, she noted that she did not observe abnormal behavior during her time at the farm. *Id.* In fact, she found the cows calm and easy to handle, found that they entered the parlor readily (even without a crowd gate), was able to collect 100 milk samples with almost no problems due to stepping or kicking, observed milk letdown to be adequate, observed almost all stalls in the lactating cow barns to be occupied with resting cows, and did not observe abnormal drinking or eating behaviors. *Id.*

In her investigation, she noted the following:

1. Milk production. In a normal lactation cycle, individual cows reach peak milk production at approximately 40-60 days in milk and then decline slowly until

they complete a lactation cycle that is approximately 300-330 days in length. Exhibit COM-5, p 4. If a herd has excellent reproductive performance, the herd average days in milk will be approximately 150-160. Id. With the exception of 2005 (herd average days in milking "DIM" = 188), the herd average DIM for Tensens' dairy always exceeded 200 days, indicating that many cows were milking later in lactation during periods when milk yield is expected to be lower. The impact of later lactation milking can be partially mitigated by use of rBST, which allows cows in later lactation to produce at higher levels. Id. Dr. Ruegg noted that the Tensen herd used rBST in 2003 through late 2005 or early 2006, and the effect of discontinuing rBST probably accounts for some of the decrease in herd milk yield that occurred in 2005-2006. Id.

2. There is circumstantial evidence that some of the decline in 2007 may have been associated with rumen acidosis. Exhibit COM-5, p 5. Dr. Ruegg indicated that when high concentrate diets are fed, rumen fermentation is disrupted and the concentration of milk fat is decreased. Id. Examination of fat and protein percentages for cows (all lactations) 41-100 DIM indicate that fat:protein inversions occurred in both late 2003 and for several months in 2007. Id. These periods of fat:protein inversion likely contributed to rumen acidosis and laminitis in the cows.
3. Bovine leukemia virus. A relatively high prevalence of serum samples (64%) were positive for bovine leukemia virus (BLV). Exhibit COM-5, p 8. Dr. Ruegg indicated that, while BLV has been associated with some reductions in

milk yield, it is unlikely to have accounted for most of the performance problems observed on Tensens' farm.

4. Salmonella. A review of animal health records of the animals still in the herd indicate that typical symptoms of Salmonella Newport (cows with post-calving fevers and/or diarrhea) occurred frequently in 2006-2008. Id. One animal was found to be positive for multidrug resistant Salmonella Newport, which is of concern because it can cause serious human disease.
5. Milk quality and mastitis testing. High proportion of subclinical infections (mastitis) is a probable cause of reduced milk yields in affected cows. Exhibit COM-5, p 9. Of 176 cows that were CMT (California Mastitis Test) tested, 96 (55%) of the cows had 1 or more blind quarters (indicative that the quarters were dried off because of chronic mastitis). Id. The current farm policy is to not treat cows with clinical mastitis and Dr. Ruegg observed 12 cows that had 1 or more quarters with visually abnormal milk that was not treated or withheld from the bulk tank. Id. Staph aureus was recovered from 17% of the milk samples cultured. Id. Dr. Ruegg stated that "[t]his high recovery of Staph aureus is indicative of a chronic problem of mastitis caused by Staph aureus. This is an unusually large prevalence for a modern dairy herd and likely the result of failure to implement an effective control program." Id at 9-10.
6. The bulk tank culture results are typical for herds that have high prevalence of cows infected with subclinical Staph aureus. Id at 10. The large number of

coliform and environmental streps indicates that milking hygiene is relatively poor (dirty udders).

7. The results of bedding cultures performed at the University of Minnesota indicate that both samples contained excessive number of bacterial colonies and indicate that cow udders are exposed to large numbers of environmental mastitis pathogens.

Overall, Dr. Ruegg concluded that:

1. Reproductive performance. Reproductive performance is a huge limitation for this dairy. During the time that Tensens were performing monthly DHIA (Dairy Herd Improvement Association) there were several periods (especially 2007) when breeding appears to have been severely neglected. Exhibit COM-5, p 11. The herd is being bread using natural service, but during the farm visit, the management of the natural breeding program was insufficient as cow groupings and bull numbers were not adequate for an effective natural service program. The failure to breed cows promptly results in many cows milking later, during lower producing stages of lactation.
2. Biosecurity. A complete lack of an adequate biosecurity program has contributed to the problems that this herd has experienced. Exhibit COM-5, p 11. The Tensens have used a risky management strategy to stock their herds. While the herd records are not completely reliable in distinguishing the source of cows, at least 65 multiparous cows entered the dairy herd since 2004. Id. Commingling of lactating cows that are sourced from outside herds without testing or quarantine is a very risky practice. Risks were also

incurred by the manner that calves were outsourced, commingled, and then returned to the herd. Id.

3. Mastitis. Mastitis remains a significant problem for this herd and is a contributing reason for the subpar production that this herd continues to experience. Exhibit COM-5, p 12. In this herd, mastitis is caused by a combination of endemic contagious mastitis (Staph aureus) and environmental mastitis caused by exposure to bacteria present in cow bedding. Id. Clinical mastitis is not being detected and the decision to not use mastitis treatments contributes to the problem. Id. The apparent decision to keep infected cows in the herd but dry off chronically infected quarters is a risky management strategy that this farm uses to manage their bulk tank SCC and is one reason that the contagious pathogens remain a problem in their herd.
4. Transition Cow Problems. The lack of an adequate transition cow program is an obvious limiting factor for performance of this herd and has been noted by a number of herd consultants that have worked with this farm. Id. The transition cow housing is simply inadequate in terms of hygiene, cow comfort, and feed-bunk space. Id. The inability to provide a dry, clean, comfortable area that has sufficient space for cows to lie down has likely contributed to disease and excessive culling of early lactation cows. Id.
5. Lameness. Feet and leg problems are common in this herd and both chronic problems and acute problems were noticeable during our visit. Id.

In her final analysis, Dr. Ruegg stated,

In my analysis of the herd records, I have not been able to identify a relationship between the herd data that I have examined and the timing of the management changes that were attempted to mitigate perceived electrical problems as described in the written report that was supplied by Nick.<sup>15</sup>

The changes observed in various measures of herd performance are likely due to typical seasonal changes, changes in diet, discontinuing rBST, infertility and to the impact of infectious disease due to poor biosecurity and lack of a mastitis control program.

*Id.*

Dr. Ruegg recommended “changes in reproductive management, nutritional management, herd health and biosecurity protocols and considerable change to several cow housing areas (especially the transition cow area).” *Id.*

D. Dr. Douglas J. Reinemann

Dr. Douglas J. Reinemann, an agricultural engineer, was also appointed by the Commission to investigate Tensens’ claims. Dr. Reinemann visited Tensen Farm on October 30, 2009, as part of his investigation. Dr. Reinemann submitted his report to the Commission on January 5, 2010. Exhibit COM-2. In his investigation, Dr. Reinemann observed the milking operations, electrical system, reviewed Consumers’ testing, and reviewed Geotech’s (George Orphan) testing.

Additionally, Dr. Reinemann was cross-examined on May 27, 2010, by counsel for Consumers and counsel for Tensens.

1. Dr. Reinemann’s Background

According to Dr. Reinemann’s testimony, he has organized a stray voltage testing course which has been running for almost 20 years and is, thus, familiar with the

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<sup>15</sup> It appears that Nick Tensen supplied Dr. Ruegg with the same information he provided to Dr. Mellenberger regarding concerns on the farm. That document, however, was not included in Dr. Ruegg’s report.

test protocols. 3 Tr 78; See also 3 Tr 184-185. He further testified that he is familiar with the research on animals and has advised several governments on the issue of stray voltage, including the State of Minnesota, the State of Wisconsin, the State of Michigan, the Province of Ontario, British Columbia, the Government of France and organizations in New Zealand, and Australia. *Id.* Dr. Reinemann testified that, at the time of his testimony, within the scientific community, in the context of published research, that there is a consensus about the known effects of stray voltage or electricity on livestock. 3 Tr 180-181. According to Dr. Reinemann,

the level at which behavioral changes have been documented actually starts at about 2 volts, and going above 2 volts, those behavioral changes will become more pronounced in more animals. As far as an actual change in water intake or feed intake or milk production, that would occur at substantially higher levels, depending on the cow, somewhere between 5 and 10 volts. So the 1-volt level, the 2-milliamp level is very conservative. The research clearly indicates that there would be no adverse harm to animals at those levels.

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. . . when you look at indicators like milk production and somatic cell count, there is no indication that anything is happening either one side or the other at that 1-volt level. So, in other words, zero volts is no different than 1 volt, and 1 volt is no different than 2 volts. . . .

3 Tr 183-184.

## 2. Dr. Reinemann's Observations of George Orphan

### a. Interaction with George Orphan

Dr. Reinemann testified that he was appointed to act as an independent expert assigned to observe the electrical testing that was to be done on the farm. 3 Tr 186-187. He, however, was unable to observe the electrical testing conducted by George Orphan (the results of which are set forth in Mr. Orphan's report – Exhibit COM-10) because there was very little testing done while he was on the farm and he was not



invited and not otherwise given information about when the testing would occur. 3 Tr 187. Because he had no information regarding the testing time, he did an analysis of the milking parlor and the milking operation. *Id.* Dr. Reinemann also reviewed the data and report of George Orphan after Mr. Orphan had completed his testing.

After speaking with Mr. Orphan and reviewing his test data, Dr. Reinemann was critical of the electrical testing done by Mr. George Orphan. According to Dr. Reinemann, he had a tour of the farm and, on the second day, “spent virtually the entire day with Mr. Orphan answering his questions and advising him about what sort of testing needed to be done.” *Id.* Dr. Reinemann testified that Mr. Orphan, “didn’t have the proper test equipment, and [] appeared to be unaware of the basic tests that need to be done for a stray voltage investigation,” despite having been informed in advance by Mr. Orphan that he was properly equipped. 3 Tr 188-198. Dr. Reinemann went on to say,

And then I got questions about how to do the test, some very basic questions about how to set up a cow contact measurement point, which is one of the most, it’s really the first step in a competent investigation. And at that point, it became clear to me that he was not aware of the testing protocols, because this would be very clearly spelled out. So I sent him the testing protocols, both from the Michigan and Wisconsin Public Service Commissions, and informed him that this is the document that describes the tests that need to be done . . . and in my discussions with him at the farm, it was clear to me that he had not studied the document. He was unaware of some of the basic terminology and some of the basic test methods required to do a stray voltage investigation.

3 Tr 189-190.

Dr. Reinemann indicated that Mr. Orphan gave him a list of the tests that he proposed to do, and that there were “several fundamental basic tests that were not on his list.” 3 Tr 208. Dr. Reinemann then suggested the testing that needed to be done.

According to Dr. Reinemann, when he arrived on the farm, “it still appeared as if he wasn’t aware of these, the test procedures I had sent him; and I said, well, at a minimum, you need to do a load box test and a farm signature test. And he said, well, we’re not equipped to do that today, but we will do that in the future.” *Id.* Dr. Reinemann testified that he suggested that Mr. Orphan contact Consumers Energy because they have the proper equipment to do the requisite testing. 3 Tr 219. Further, Dr. Reinemann did not obtain the proper equipment from Consumers because Mr. Orphan told him that he had the proper equipment. *Id.*

b. Opinion of George Orphan’s Test Results

i. Improper Measurement Instruments

Ultimately, Dr. Reinemann acknowledged that Mr. Orphan’s data demonstrated seven (7) events that exceeded the 1-volt preventative action threshold, but did not accept the readings, saying they were unreliable and of questionable validity for a variety of reasons from the uncharacteristic/unusual nature of the readings (in terms of real data and the Tensen Farm), to the type of equipment used. 3 Tr 192-201; 3 Tr 225-231. Dr. Reinemann testified that although Mr. Orphan represented that he had the proper equipment needed to do the testing, “[h]e didn’t have the equipment, and he still doesn’t.” 3 Tr 219.

Dr. Reinemann testified that he accompanied Mr. Orphan on numerous attempts to find a cow contact voltage, saying,

We tested in the parlor for several hours, we could find nothing even that measured on his meter. Then we went out into the freestyle barn, we went out to the waterer, we tried to find some animal contact readings, we couldn’t find anything that registered on his meter. And finally he put the meter on to a metal pipe, piece of stallwork in the freestyle barn, and there

we were able to record some very low-level reading. So we tried very hard to find readings, and we couldn't.

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There were no readings that registered on the meter that Mr. Orphan used, and part of the reason for that is that he was using the wrong meter.

3 Tr 224-225.

ii. Deterioration of Electrical System on Farm

Additionally, when comparing the data from a Consumers' 72-hour test conducted in August, 2008, to Mr. Orphan's 72-hour test conducted in late 2009, Dr. Reinemann noted that,

The Consumers testing showed secondary-neutral-to-earth readings, well, the barn service neutral-to-earth, which both parties measured, during the Consumers testing was typically about 2/10 of a volt, and for one brief period went up to be 7/10 of a volt, clearly caused by an on-farm source. And when we look at the secondary-neutral-to-earth measurement by Orphan, the numbers are considerably higher, typically, you know, between 1 volt and 2 volts. So my conclusion from that is that I believe the same on-farm source was present in both situations, but there was some significant deterioration of the farm wiring between these two tests that created a substantial on-farm source of secondary-neutral-to earth voltage.

3 Tr 203-204.

Dr. Reinemann stated that he believed something had changed on the farm during the time between the test conducted by Consumers and the test conducted by Mr. Orphan because,

the primary-neutral-to-earth voltages are essentially the same, the primary neutral appears to be no different, but the secondary-neutral-to-earth is substantially higher . . . some of the changes that might account for that are removing of grounding on the farm, possibly any sort of change in the wiring system that might result in a higher resistance connection on a neutral wire, a longer run of wire. It appears to me as if there might be some interconnection between the two services on the farm during the Orphan test that were not apparent during the Consumer Energy test.

3 Tr 204-205.

Dr. Reinemann pointed to the findings of James H. Worden in support of his belief that the grounding system on the Tensen Farm had been compromised, which “could account for elevated secondary-neutral-to-earth voltage.” 3 Tr 205. Dr. Reinemann was concerned enough with the possible compromise of the electrical system of Tensen Farm that he informed the Tensens that there was a potential of serious injury to livestock or people because of the farm wiring. 3 Tr 206.

Dr. Reinemann further testified,

Well, if the farm had been wired properly, the animal confinement areas of the farm would have been isolated . . . And I suspect that one of the things that happened between Consumers testing and the Orphan testing that is a connection was made between the non-isolated, non-animal confinement parts of the facility and the animal confinement parts either inadvertently or intentionally to bring the level of animal contact voltages in the animal confinement areas up.

iii. Improper Use of Load Box Test

According to Dr. Reinemann, a load box test is a test used in stray voltage investigations to identify on-farm sources of neutral voltage. 3 Tr 207. After hearing Mr. Orphan testify regarding the load box test he conducted, Dr. Reinemann said,

[m]y notes say that he said there was no on-farm source because when the farm was shut off to do what he called the load bank test, there was no voltage on the farm, the cow contact went to zero, and the cow contact voltage increased as the load bank voltage increased. And the reason I was so shocked at this response is that it indicates that he doesn't understand what the purpose of a load box test is, he doesn't know how to differentiate on-farm from off-farm source. It's a very basic diagnostic procedure in any stray voltage investigation to differentiate between on-farm and off-farm sources, and he clearly didn't know how to do that . . . His conclusion was absolutely wrong.

3 Tr 206-207.

Ultimately, Dr. Reinemann testified that Mr. Orphan did not properly test to identify on-farm sources of neutral voltage. 3 Tr 207. Dr. Reinemann said, “he still doesn’t know how to do the test.” 3 Tr 220.

iv. Anomalies in Test Results

When reviewing Mr. Orphan’s data, Dr. Reinemann found what he deemed to be three anomalies in the data. The first anomaly is found in the one-plate data set. Exhibit COM-2, p 14. Dr. Reinemann indicates that “[t]his is one of the time periods in which voltage readings go to zero or near-zero values . . . Each test location records a near-zero value for a period of about 2 minutes. This zeroing of each recorded channel proceeds sequentially through all four recording channels.” *Id.*

The second anomaly is found in the one-plate data set in which the Animal Contact Voltage (AC) was recorded at unusually high values. Dr. Reinemann notes that “[t]he AC voltage begins at about 0.5 Vrms and then goes to zero for a short period, followed by an instantaneous increase to about 6.8 Vrms.” Exhibit COM -2, p 15. The DC reading at animal contact similarly starts at a low value and then a short time after the AC voltage is elevated the DC voltage jumps to about 12 volts. *Id.* The AC component of the animal contact location shows a slow decline to about 2.5 Vrms and then an increase to a 3.5 Vrms and again goes to zero. *Id.* Dr. Reinemann notes that “at the end of this anomaly the animal contact location returns to its typical value of about 0.5 Vrms.” *Id.* He also notes that “[n]ear the end of this anomaly the DC voltage is momentarily elevated to an extremely high value (above 110 volts) and then steps down to a zero value at the same time as the AC component of the animal contact reading.” *Id.*

The third anomaly appears in the four-plate data set. According to Dr. Reinemann, “[t]he shape of the AC voltage anomaly in the one-plate data set appeared similar to the shape of the Primary-to-Neutral voltage in the four-plate data set.” Exhibit COM-2, p 16. In his report, Dr. Reinemann states,

In this case the primary neutral voltage was also elevated to a level that was unusually high compared to other readings over the 3 day period. The primary neutral voltage also shows the same lack of variation over time as does the animal contact voltage anomaly 3. The pattern of slow decline is also similar between anomalies 2 and 3. The primary neutral DC voltage readings in anomaly 3 are also of similar values as those in anomaly 2 with the addition of several more extremely high readings in excess of 110 volts.

Exhibit COM-2, p 16.

According to Dr. Reinemann,

1. If the elevated animal contact voltages represented in anomaly 2 are taken at face value, they are indications of a severe and very unusual on-farm source of voltage as there is no indication of any disturbance on the primary system when these elevated animal contact voltages are present;
2. The data presented in anomaly 3 indicates a moderate voltage elevation of primary neutral voltage but no corresponding increase in animal contact voltages, indicating that the primary system is not contributing to animal contact voltages;
3. The anomalies presented in Geotech’s data are not likely to be representative of the true voltage conditions at the locations utilized because the readings are highly unusual compared to the rest of the 72-hour test period and are

also highly unusual compared to the thousands of similar measurements he reviewed on other farms over the past 20 years;

4. There was some problem with the recording equipment that produced the highly unusual readings which is demonstrated by the dramatic change in the frequency characteristics of the measurements during the anomalies, the dramatic change in voltage levels during the anomalies, and the fact that a similar anomaly occurred during both recording sessions but on different channels of the recording device.

Exhibit COM-2, p17.

v. Conclusion

Dr. Reinemann testified that the data of Mr. Orphan could not be relied on to make the conclusion that there was either 1 volt or 2 milliamps cow contact as represented in his testing on the farm, or that Consumers contributed to more than 2 milliamp to those cow contact voltages because there were too many problems with his data. 3 Tr 208-209; 3 Tr 214. Dr. Reinemann did, however testify that he could reliably conclude that there is a serious on-farm electrical wiring problem on the farm. 3 Tr 209. Dr. Reinemann stated,

I would not rely on these test results. If it were my farm, I would not rely on these tests. In a court of law, I would not rely on these tests. There's too many holes in the data. There's too many admissions of improper testing procedure by Mr. Orphan

3 Tr 220.

Overall, Dr. Reinemann testified that,

The utility system does not appear to be the major contributor to animal contact voltages on the farm. There is an indication of considerable on-

farm sources of animal contact voltage and very likely some form of interaction between the isolated service at the barn and the non-isolated service to the well and grain handling center. Although these are 2 separate services it is possible that some interconnection between them exists on the farm. If this is the case, the interconnection should be found and disconnected. Isolation of grain service may also be advisable.

### 3. Review of Consumers Energy Testing

In addition to reviewing the testing of Mr. Orphan, Dr. Reinemann also reviewed the testing conducted by Consumers. Exhibit COM-2, p 6. The Consumers testing was conducted from August 19, 2008, through August 22, 2008, and was conducted at the request of Tensens son, Nick Tensen. Exhibit COM-2, p 19. Steven Wallenwine conducted the testing. *Id.* According to the testing, the highest one-minute average measurement by the SVM-10 monitor during the 72 hours was 0.58 volt on 8/21/2008. *Id.*

In Dr. Reinemann's report to the Commission, he notes that "[a] thorough survey of animal contact voltages (38 different locations) was conducted on the farm. These measurements were done in accordance with the accepted practice of recording voltages both open circuit, and with a shunt resistor approximating the combination resistance of a cow and its contact points (500 Ohms nominal, 468 Ohms specific to these tests)." Exhibit COM-2, p 6. He found that the vast majority of the animal contact readings showed voltage readings far below those of any practical consequence to farm animals. *Id.* In addition, Dr. Reinemann notes that,

[a]n animal contact was chosen for the 72 hour recording at the request of Nick Tensen as indicated in the CE [Consumers Energy] report. Monitoring points were also established for Primary-Neutral-to-Earth [PNE], Secondary-Neutral-to-Earth [SNE], and Barn-Service-Neutral-to-Earth [BNE] as further specified in the CE report . . . The CC voltages are well below levels that would affect dairy cows . . . The period of elevated



SNE, BNE and CC [cow contact] voltages on Thursday 21 August is the one exception when there appeared to be interaction between the Primary and secondary systems. This period of elevated CC, SNE, and BNE voltages correspond to a period of decreased PNE voltages. This is an indication that this was an on-farm source of voltage that was out of phase with the primary neutral current. There are 2 services to the farm, one supplying the Barns and Milking facilities and a second service supplying the well, grain dryer and bins. It appears as if the service to the well and grain center is not isolated. The interaction between the primary and secondary could be caused by a substantial on-farm neutral voltage source on this service.

Exhibit COM-2, p 6-7.

#### 4. Milking Operations Observations

In Dr. Reinemann's report, he found: (1) maintenance of the milking machines is required (pulsation faults found would result in somewhat slower milking in the stalls indicated relative to other milking stalls); (2) a number of cows kicked during teat conditioning assessment (21 of 102 cows), which indicates a moderate level of discomfort produced by the milking process, most likely due to over-milking of some cows; (3) 18 of 102 cows exhibited an unusual amount of stepping during milking as a result of foot and/or leg problems or moderate to severe lameness; and (4) the percentage of cows with moderately dirt covered or covered with dirt udders (85%) is a level that has been shown to be correlated with increased incidence of mastitis. Exhibit COM-2, pp 3-5.

#### E. George J. Orphan (Geotech, Inc.)

George J. Orphan, an electrical engineer, was also appointed by the Commission to investigate Tensens' claims. As part of his investigation, Mr. Orphan visited Tensens' farm on October 30, December 2, December 7, and December 11, 2009. In addition,

Mr. Orphan visited the farm on November 14, November 23, November 28, December 7, December 13, and December 18, 2009, to perform additional tests. Mr. Orphan submitted his report to the Commission on January 6, 2010. Exhibit COM-1.

1. George Orphan's Background

George Orphan testified that he has a Bachelor of Science in Electrical Engineering, but is not a licensed electrician. 2 Tr 23. He indicated that his career has been in electrical engineering, engineering primary distributions systems, standby generator systems, substations, industrial electrical systems, commercial electrical systems, and residential electrical systems. 2 Tr 18. Mr. Orphan testified that on two other occasions he was called on to investigate stray voltage. 2 Tr 24-25. The first was for a vacant lot in Grand Rapids in 1995 and the second was for a crop farm in Oceana county in 1998. *Id.* Mr. Orphan testified that he has had no formal training to do a stray voltage investigation on a farm, but said, "I fall back on my experience over the many years of designing, implementing electrical systems." 2 Tr 27. Mr. Orphan indicated that while he had investigated electrocutions, fires caused by electrical systems, and appliance problems, he went on to say, "the Tensen Farm was the only stray voltage that I conducted a very thorough analysis on." 2 Tr 29-30. Ultimately, Mr. Orphan testified that he felt he was a good candidate to act as an independent expert in this matter because of his "total history in electrical engineering and [his] own character." 2 Tr 43.

## 2. Prior Contact with Tensens

According to Mr. Orphan, prior to being contacted by the Commission, he was contacted by Tensens to look into their concerns on the farm. Mr. Orphan testified that sometime on or before August 19, 2008,<sup>16</sup> a year prior to being appointed by the Commission, he had discussions with Mr. Tensen over concerns that “there was suspected stray voltage on his farm, that his cows were not producing, and he needed somebody to look at the farm to see if that person could find something wrong.”<sup>17</sup> 2 Tr 52-53. Mr. Orphan testified that prior to his appointment as an expert in this matter; he also met the Complainants’ counsel, Mr. Stariha. 2 Tr 54-55. At the time Mr. Orphan testified, he had no involvement in the Muskegon County Circuit Court case, had not been asked to provide expert consulting services in connection with that lawsuit, and had no indication from Complainants that they felt he would be a good candidate to assist them in that matter. 2 Tr 54-56. Mr. Orphan testified that he billed the Tensens and was paid by the Tensens for his assistance prior to his appointment by the Commission, but could not recall how much he was paid. 2 Tr 47-48, 57-61. Mr. Orphan considered the Tensens his clients when he worked for them, but no longer his clients after his work was complete. 2 Tr 59.

When Mr. Orphan was working for the Tensens, Tensens requested that he be present at the farm while Consumers was conducting its 72-hour test. 2 Tr 79-80.

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<sup>16</sup> August 19, 2008, was the date that Consumers Energy conducted its first 72-hour testing. Mr. Orphan testified that he was there for that testing but could not recall whether it was that day or some time prior that he began working with Tensens. 2 Tr 52-54.

<sup>17</sup> Based on Mr. Orphan’s testimony, a third party “recommended that I [George Orphan] contact the Tensens and let them know that we were available to help.” 2 Tr 51. While George Orphan stopped short of agreeing that his office solicited work from the Tensens, the testimony is unclear whether George Orphan or his staff contacted the Tensens or if the Tensens contacted George Orphan. See 2 Tr 50-52. In light of his lack of experience in doing these types of investigations, Mr. Orphan did not know why he was recommended to the Tensens by a third party. 2 Tr 52.

Tensens asked Mr. Orphan to observe the testing and conduct any testing he considered necessary. 2 Tr 80. At that time, Mr. Orphan considered himself a representative of Tensens. 2 Tr 80.

After the Tensens requested the Commission appoint a panel of experts, Tensens, by two separate correspondences dated June 30, 2009, and August 10, 2009, requested George Orphan be appointed as a member of that panel. Exhibits CE-7 and CE-8. Tensens were dissatisfied with other recommendations of the Commission and, thus, after some strong words were exchanged, Tensens' request was honored and George Orphan was appointed as one of the panel of experts in this matter.

Mr. Orphan testified that he did not disclose his prior work relationship with the Tensens because he said, "I didn't see the work that I had done previous was in conflict with the request by the Commission." 2 Tr 42.

### 3. Mr. Orphan's Testing

Mr. Orphan first appeared at the Tensen Farm on October 31, 2009, in his capacity as an expert on the panel appointed by the Commission. 3 Tr 119. At that time, Mr. Orphan testified that his understanding "was a little different than as it says here – on a committee to investigate stray voltage." 2 Tr 41. So, when Mr. Orphan first arrived at the farm on October 31, 2009, he thought the "purpose that day was to determine what was necessary to do so that I was cooperating with the other members of the panel and then I would do my test." 2 Tr 97. He testified that he "thought that we were going to the farm as a team to determine whether there's stray voltage or not and whether it was affecting animals; and, as I later found out, it wasn't a team effort." 2 Tr 97. Additionally, when Mr. Orphan discovered that the investigation was not going to be

a team effort and went to conduct the 72-hour test, he discovered that his testing equipment was not adequate because “[t]he equipment we had ordered to do that work came, and once it came that week and to our office, and when I got to the farm, I realized that it was not adequate to do the job, it was, it could only do half the job, and so we couldn’t use it at that point.” *Id.*; 3 Tr 119.

Mr. Orphan returned to the farm on December 7, 2009, and conducted a 72-hour 4-plate test. Exhibit COM-1, p 13; 2 Tr 93. Unfortunately, the 4-plate test was not part of the Stray Voltage Rules protocol. Mr. Orphan testified that he used a 4-plate test instead of a 1-plate test because “I thought the regulation was a little bit strange in having a one-foot animal, so I started with a four-foot animal, and then corrected that to a one-foot animal.” 2 Tr 33. Mr. Orphan also testified that “[a]t the beginning I didn’t realize I needed four inputs simultaneously and, therefore, redid some work because of that.” 2 Tr 34.

While on the farm on October 31, 2009, Mr. Orphan testified that he did seek guidance from others who had more experience in doing stray voltage investigations and testing, including Dr. Reinemann. 2 Tr 34. Mr. Orphan described Dr. Reinemann as “reluctant” to share his knowledge because, “he thought I [Mr. Orphan] was incompetent.” 2 T 34-35. However, Mr. Orphan testified that Dr. Reinemann suggested to him that he should do a “signature test.” 3 Tr 112. While Mr. Orphan testified that he did not know what the terminology “signature test” means, he indicated that he believed he conducted a “signature test.” 3 Tr 111-113.

Mr. Orphan then returned to the farm on December 11, 2009, and conducted a second 72-hour 1-plate test. Exhibit COM-1, p 16. Mr. Orphan testified that

“subsequent to that first test, I then realized that to meet the Michigan Public Service Commission requirements, I needed to do the same test over . . . “ 2 Tr 77. According to Mr. Orphan, he

- Measured the steady state of animal contact voltage with the neutral-to-earth voltage at the primary distribution system at the building panel for 72 hours;
- Determined the highest level of animal contact voltage that occurred during the 72-hour monitoring;
- Determined the primary-neutral-to-earth voltage at the utility transformer that occurred at that same time;
- Turned off the farm electrical load and applied a temporary electrical load at the utility transformer to produce the same level of neutral-to-earth voltage at the utility transformer as found during the 72-hour monitoring;
- Measured the animal contact voltage again;
- Used the new animal contact voltage measure after the farm electrical load was turning off, and compared it to the animal contact voltage measured during the 72-hour monitoring;
- Determined the utility contribution to animal contact current using Ohm's law;
- Identified all probable animal contact locations where an animal is likely to make simultaneous contact with two points between which a voltage may be present;
- Measured animal contact voltage with a nominal 500-ohm shunt resistor placed across the input leads of the voltage measuring instrument;
- Made those measurements with a metal plate with an area of 12-16 square inches and with a conductive material between the metal plate and the floor or earth;
- Recorded the necessary measurements digitally to determine the steady state of voltage;
- Received the equipment for Picoscope Corporation;
- Used data obtained from the reads as part of his report;
- Observed instances of animal contact voltage measured with a shunt resistor in excess of one volt; and

- Measured steady state of voltage in excess of one minute and in excess of one volt.

3 Tr 120-124.

Prior to returning to Tensens' Farm to conduct the 4-plate test or the 1-plate test, he did not advise the Commission, Consumers, Dr. Reinemann, or any other member of the expert panel of the time and date of his proposed testing. 2 Tr 104. Thus, no one was offered the opportunity to observe either of Mr. Orphan's 72-hour testing events. *Id.*

Mr. Orphan's testing resulted in the following:

- 316 records over 2 volts (animal contact AC voltage) – with maximum reading of 6.722 volts on 12/13/2009 at 14:50:43;
- 316 records over 10 volts (animal contact DC voltage) – with maximum reading of 116.9 volts on 12/13/09 at 16:07:13;
- 329 recordings over 61 hertz (at animal contact) – with maximum reading of 613.38 hertz on 12/13/09 at 14:52:28;
- 4,682 recordings over 2 volts (AC primary-neutral-to-earth voltage) – with maximum reading of 7.477 volts on 12/12/2009 at 16:51:28;
- zero recordings over 2 volts (DC primary-neutral-to-earth voltage) – with maximum reading of .274 volts on 12/12/2009 at 11:40:13;
- 32 recordings over 61 hertz (primary-neutral to earth) – with maximum reading of 607.59 hertz on 12/12/2009 at 16:03:13;
- 11,497 recordings over 1 volt (animal-barn-neutral-to-earth AC voltage) – with maximum reading of 1.983 volts on 12/12/2009 at 12:06:43;

- Zero recording over 1 volt (animal-barn-neutral-to-earth DC voltage) – with maximum reading of -.999 volts on 12/12/2009 at 00:36:58;
- 11,610 recordings over 2 volts (primary-neutral-to-animal-barn neutral AC volts) – with maximum reading of 7.421 volts on 12/12/2009 at 16:51:43; and
- Zero recordings over 1 volt (primary-neutral-to-animal-barn-neutral DC voltage) – with a maximum reading of -.181 volts on 12/12/2009 at 04:25:58.

3 Tr 124; Exhibit COM-1, p 16-17.

According to Mr. Orphan, the device that he used sampled at 15-second intervals. *Id.* Mr. Orphan further testified that he could find no on-farm contribution to the levels of voltage measured at the animal contact points. 3 Tr 124-125. Mr. Orphan justified this position by saying that “when we conducted our load test and shut the farm completely off, our readings were zero.” 3 Tr 125. Based on this observation, Mr. Orphan determined that there was no evidence of on farm voltage. *Id.* Similarly, Mr. Orphan testified that “[w]hen we started to load the transformer, or the load bank up from the transformer, we saw a linear relationship between load and voltage on the farm.” *Id.* Thus, he concluded that the voltage was based primarily on Consumers’ contribution.

Mr. Orphan also did other testing which was beyond the scope of that provided for under the testing protocol for mitigation of stray voltage including, but not limited to, numerous observation of vibrations in the service pole (at the request of Tensens), earth ground resistance and ground current flow tests on the Consumers energy pole-line in the vicinity of the Tensens Farm, two insulation resistance tests on five electrical feeder circuits on the Tensens Farm using an insulation megger, and a 72-hour 4-plate



test. Exhibit COM-1. Mr. Orphan testified that he went beyond the scope of the testing protocol and the task assigned by the Commission because, "I'm an investigator and I'm not going to let anything go unturned. I want to make sure I looked at every aspect of what was going on the farm."<sup>18</sup> 2 Tr 66-67.

#### 4. Conclusions and Recommendations of Mr. Orphan

Overall, Mr. Orphan concluded that, (1) "higher-than-normal Animal Contact voltages" are the result of below standard design, construction, and maintenance procedures by both Consumers Energy and the Tensen Farm, (2) Animal Contact voltage "exceeded the comfort level of the cows," (3) the load bank test, while the farm was de-energized, indicated significant contribution by Consumers was present at the Animal Contact locations, (4) the 1-plate test revealed significant "abnormal conditions" occurring on December 13, 2009, and that the conditions were "sufficient to deter the livestock", and (5) the livestock has experienced "voltages above normal." Exhibit COM-1, p 18-20. Nowhere in the conclusions and recommendations did Mr. Orphan discuss his use of protocol or make a determination of whether or not animal contact current met or exceeded the preventative action levels defined in the Stray Voltage Rules.

Mr. Orphan explained that his opinion is influenced by, (1) the pole-line indicates less than adequate grounding, (2) the primary and secondary neutral separation is within one ohm, (3) the pole-line noise, insulator buzzing and tree/brush trimming

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<sup>18</sup> Mr. Orphan's fees were reduced from \$27,536.50 to \$17,667.75 because in Staff's opinion "he was not ready to perform required tests, listed items which demonstrated the stray voltage protocol was not followed, listed excessive hours for his tests performed, listed excessive charges for copying and mapping, listed tests and trips that were repetitive and not necessary, charged excessive amounts for labor for his tests, and charged excessive amounts for copying his reports." 2 Tr 72-73.

neglect supports the need for better maintenance, (4) the influence of ground and neutral voltages on the farm while the farm is not energized is evidence that the primary system has significant affect on the farm system, (5) the use of a two-transformer configuration to derive a 3-phase service from a Vee-phase primary adds to the possibility of abnormal conditions, and (6) the electrical system on the farm is in poor condition, and may contribute to the problem. Exhibit COM-1, p 20.

Mr. Orphan's recommendations included suggestions for repairs to be made by the Tensens and repairs to be made by Consumers. Mr. Orphan suggested that Tensens repair or replace existing electrical feeders, damaged panelboards, safety switches and motor starters, equipment enclosures, and cables, and suggested that farm receptacles that are exposed to damp locations be protected from the weather with weatherproof boxes and equipped with "in-use covers and GFI." Exhibit COM-1, p 21. Mr. Orphan also suggested that Tensens replace the existing 77 ampere, three blade fusible disconnect feeding the Animal Building Panelboard with a new 100 ampere, two blade fusible disconnect. Exhibit COM-1, p 22.

Mr. Orphan suggested that Consumers, (1) ground the secondary neutral at the well service entrance, (2) isolate the primary and secondary grounding conductors from their associated neutrals at the top of the maypole and, once isolated, conduct testing to verify that the spark-gap between the primary and secondary neutrals is open, test the resistance of the primary grounding conductor to earth, test the resistance of the secondary grounding conductor to earth, and test the resistance between the primary and secondary ground electrodes, (3) restore grounding connections to their original state upon completion of tests, (4) extend three phase primary to the farm, (5) serve the

farm with a true 120/208 volt, 3 phase electric service from a padmount transformer(s) installed on the farm, (5) primary line be relocated to the road right-of-way, and (6) re-test and confirm pole-line neutral to grounding conductor connections, isolate each rod and its resistance to earth – measure with a null balance megger, and at each of the poles test the grounding conductor connection to the ground rod and restore to Consumers Energy. Exhibit COM-1, p 22-23.

### **III.**

#### **OTHER TESTIMONY AND POSITION OF THE PARTIES**

##### **A. Staff**

Peter J. Derkos, Public Utilities Engineer Specialist in the Electric Operations Section of the MPSC Operations and Wholesale Marketing Division testified on behalf of Staff. Mr. Derkos gave a chronology of the Tensens' complaints and the actions taken by the Commission to address the complaints and then testified regarding Staff's interpretation of the stray voltage rules. 4 Tr 272-282.

According to Mr. Derkos, Staff does not have confidence in Mr. Orphan's findings, conclusions or recommendations because, (1) they don't believe that Mr. Orphan had a full understanding of his role in the investigation, particularly in the application of this process, i.e. the stray voltage rules, (2) he never used the word "protocol" in his report, (3) he did not follow the requirement that he record data in 60-second intervals, (4) he never discussed "preventative action level" in his report, and (5) there were anomalies in his data. 4 Tr 284-285. Mr. Derkos also testified that Mr. Orphan "conducted tests that were outside the scope of the rules and repeated others."

*Id.* Further, Mr. Derkos testified that Mr. Orphan “ran the load box test before doing the 72 hour test, which he ran twice.” *Id.* Mr. Derkos criticizes Mr. Orphan for the first 72 hour test because it wasn’t in compliance with the rules, ran a load box test that was not necessary because the 72 hour test did not reveal voltage above the preventative action level and did not explain the significance of these or other tests as it pertains to the application in this process. *Id.* Mr. Derkos testified that there was value in the tests that were outside the scope of the stray voltage rules because those tests can be conducted to troubleshoot or diagnose problems that warrant attention. 4 Tr. 286. However, “these tests would be for purposes other than determining if animal contact current exceeded a preventative action level.” *Id.*

Staff takes the position that, under the Rules, the threshold question is whether there was stray voltage that exceeded the preventative action level. Staff’s Initial Brief, p 5. Thus, according to Staff, the preventative action level limits the scope of this proceeding. *Id.* “If there is not stray voltage on the Tensens’ farm above the preventative action level, then Consumers Energy [] does not have to take steps to remediate stray voltage.” *Id.* Staff points to R 460.2703(1) which states,

*If the steady state animal contact current from all sources as measured by the utility in accordance with this rule meets or exceeds the preventative action level, and if the utility contribution exceeds 1 milliamperere RMS [root mean square], then the utility shall commence action within 2 business days, or at a mutually agreed upon timeframe between the complainant and the utility, to reduce the utility contribution to 1 milliamperere or less.*

*Id.* (emphasis added).

It is Staff’s position that “[t]his rule reflects the Commission’s view that stray voltage below the preventative action level is not cause for concern.” *Id.* The Commission, according to Staff, therefore, “has no obligation to resolve other issues

unless the Tensens first present evidence that stray voltage exceeded the preventative action level.” *Id.*

Staff notes that Mr. Thiel, Mr. Wallenwine, and Mr. Forster all conducted tests and all failed to find evidence of stray voltage that exceeded the preventative action level. Staff’s Initial Brief, p 9-15. Further, Staff’s criticism of Mr. Orphan’s failure to discuss whether or not protocol was followed in his testing and whether or not he believed the preventative action level had been reached or surpassed, demonstrates that Staff does not believe that Mr. Orphan’s testing resulting in a finding that the preventative action level was met or exceeded – which is consistent with all other testing conducted by others involved in this matter.

Mr. Derkos testified that Staff has to give weight to only those tests that are applicable to the stray voltage rules. 4 Tr 291. He testified that Staff believes that Consumers Energy conducted testing pursuant to the rules, which was supported by a joint testing conducted by stipulation of the parties. *Id.* Additionally, he testified that Staff believes that the tests indicate that Consumers Energy is not contributing more than acceptable animal contact current. *Id.* Finally, Mr. Derkos testified that Staff recommends to the Commission that Consumers continue to do maintenance on its systems including the grounding and isolation systems on and near the Tensen Family Farm. *Id.* Staff further recommended that the Commission issue a decision favorable to Consumers.

#### B. Consumers

According to Consumers, the Commission has done the following (1) “established a conservative level for measured ‘stray voltage’ on livestock farms – the

‘preventative action level,’” (2) established, “the allowable limit for utility contribution to animal contact stray voltage, applicable only if the ‘preventative action level’ is first established, and (3) established the “requirements for mitigation by the utility if the animal contact and utility contribution thresholds have been demonstrated.” Consumers’ Initial Brief, p 2. Consistent with Staff’s position, Consumers asserts that “[c]omplainants bringing a contested case under these Rules, having the burden of proof, must therefore present admissible evidence, first, showing that the “preventative action level” threshold has been demonstrated.” *Id.*

Consumers asserts that of the four (4) individuals<sup>19</sup> that Tensens attempted to rely on in support of their claim of stray voltage, only one (1), George Orphan, has the possibility of satisfying their burden, but ultimately does not do so. Consumers’ Initial Brief, p 13.

According to Consumers, Mr. Orphan’s test results are invalid for a number of reasons. First, Consumers asserts that Mr. Orphan had been doing work on the Tensen Farm as a hired consultant in support of Tensens’ stray voltage claim for at least a year prior to his appointment. *Id.* at 14. Consumers points out that “he knew when he was doing stray voltage consulting work for the Tensens, long before he was appointed as an expert by Staff, that the Tensens had already filed a stray voltage lawsuit in Muskegon County Circuit Court.” *Id.* at 15. Consumers also notes that Mr. Orphan viewed the Tensens as his “client” at that time. *Id.* The Tensens failed to disclose this relationship when they strenuously sought Mr. Orphan’s appointment as an

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<sup>19</sup> Mr. Thiel, whose testimony and test results were not offered into evidence; Mr. Neubauer, whose testimony and test results were not offered into evidence; and Mr. Bodman, whose testimony was largely stricken due to reliance on test results of Neubauer and Thiel as a basis for his opinion.

expert in this matter, and Mr. Orphan failed to disclose this relationship to Staff/the Commission when they contacted him to act as an expert. *Id* at 14-15. Thus, Consumers asserts that he was not a disinterested, independent expert and believes that this casts doubt on his testing and opinion in this matter.

Second, Consumers asserts that Mr. Orphan's reported test results are equivocal as to whether or not the preventative action level was met. Consumers points out that while Mr. Orphan lists a maximum cow contact voltage reading of 6.722 volts and also reports 316 recordings over 2 volts, he does not report that his test results demonstrate that the preventative action level was met or exceeded. *Id* at 18-19. Further, Consumers points out that Mr. Orphan fails to state or reference any data showing that Consumers' contribution exceeded the 1 milliamp threshold in the Rules. *Id.*

Third, Consumers asserts that Mr. Orphan's data is unusual and indicative of instrument error and lack of understanding of the proper testing. In support of this position, Consumers cites Dr. Reinemann's opinion and report in support of its position that Mr. Orphan's reported results are not reliable. Consumers cites Dr. Reinemann's opinion that the "very unusual" and "anomalous readings" from Mr. Orphan's testing were "uncharacteristic of real data [and] uncharacteristic of any other recordings of the farm" and likely due to instrumental error. Consumers, similarly, notes Dr. Reinemann's opinion that the points at which the data recorded "\*\*\*\*\*" means that the equipment was not working properly. *Id* at 19-20. Finally, Consumers notes Dr. Reinemann's opinion that Mr. Orphan did not know how to do a load box test and a farm signature test and did not understand how to determine on-farm source and how to differentiate on-farm

from off-farm source, saying that Mr. Orphan's conclusion "was absolutely wrong." *Id* at 21-22. Ultimately, Consumers points to Dr. Reinemann's opinion that he would not rely on Mr. Orphan's data or report to conclude that the preventative action level had been met or that Consumers contributed more than 1 milliamp. *Id* at 22-23.

1. Testimony of Charles Forster

In addition to Dr. Reinemann, Consumers relies on the testimony of Charles Forster, a professional electrical engineer in private practice doing business as Phasor Labs. According to Mr. Forster, he has completed "hundreds of farm investigations" involving stray voltage. 4 Tr 314. Mr. Forster has "specialized in the review and operation of electrical equipment as used in electrical power systems and especially stray voltage investigations." *Id*. Mr. Forster testified that he focuses "on the use and mis-use of test equipment when investigating stray voltage concerns." *Id*. In connection with this matter, Mr. Forster testified that he reviewed the reports of Mr. Orphan, Mr. Thiel, and Consumers, along with exhibits, and he also conducted joint testing with Mr. Thiel. 4 Tr 316-317.

As noted in Consumers' Initial Brief, like Dr. Reinemann, Mr. Forster found a number of problems with the test results reported by Mr. Orphan, which both individually and collectively lead to his conclusion that Mr. Orphan's reported data was not valid.

a. One-minute Average. Mr. Forester first noted that Mr. Orphan recorded only a single "point-in-time reading every 15 seconds," and did not record or report 60 second average readings as required by the Rules. 4 Tr 320. According to Mr. Forster's testimony, "[u]sing only 4 'sample' readings per minute from Mr. Orphan's



equipment to try and calculate the 1-minute average is not possible and does not meet the intent or requirement of the Commission Rules.” *Id.*

b. Testing Equipment. With regarding to testing equipment, Mr. Forster testified that he and Consumers used the PMI Model SV-10 for testing the Tensen Farm and that said unit “meets the exact requirements of the Commission Rules.” 4 Tr 321. He noted that the PMI makes 3600 measurements of a 60Hz cycle in each one-minute interval and then averages those values to report a true one-minute average of voltage or current. *Id.* As to Mr. Orphan’s testing instruments, Mr. Forster noted that Mr. Orphan reported using a PICO scope Model 4424 to record the 72 hour data. 4 Tr 322; 2 Tr 91. Mr. Forster noted that a PICO scope unit was depicted in one of Mr. Orphan’s photographs set forth in Exhibit COM-1, Appendix H, p 0001281. 4 Tr 322. According to Mr. Forster, the “PICO scope Model 4424 has 4 channels for input,” but “Mr. Orphan’s data indicates 10 channels were recorded.” 4 Tr 323. Mr. Forster testified that the photograph from Mr. Orphan’s Exhibit COM-1, Appendix H, p 0001284, however, indicates that Mr. Orphan used a PICO data logger. According to Mr. Forster, Mr. Orphan did not supply him with the data files from either the PICO scope or the PICO data logger, in response to subpoena and he, therefore, could not confirm which type of instrument was used.

Mr. Forster, however, did testify that the logger used by Mr. Orphan to measure cow contact voltage and the primary to neutral earth voltage had the ability to measure the frequency of the electrical signals. 4 Tr 329. He indicated that “[p]rimary neutral voltages normally will register as 60 Hertz, which is the frequency supplied by the utility, unless they are very small in magnitude. *Id.* Mr. Forster noted that when he plotted the

frequency of the primary neutral, barn neutral and the cow contact voltage from Mr. Orphan's data, the 2 periods of 500 -600 Hertz were abnormal, suggesting a recording problem. 4 Tr 330.

Additionally, Mr. Forster testified that when Mr. Orphan was conducting the primary profile measurements, the ammeter used to measure the current on the pole ground wire was not adequate to measure the low levels of current. 4 Tr 330. Thus, Mr. Forster testified that the data is "not usable." 4 Tr 331. Mr. Forster testified that "[t]his measurement is not required by the Commission Rules, but is a normal measurement made in a stray voltage investigation." *Id.* He, however, testified that the "measurement was not performed correctly." *Id.*

c. Load Bank Test<sup>20</sup>. According to Mr. Forster, this test is intended to assess the utility's contribution to cow contact voltage/current. 4 Tr 321. Mr. Forster testified that "the farm should be load box tested in an 'as found' condition, meaning with the primary and secondary neutrals separated." *Id.* Mr. Forster went on to say that the data collected during Mr. Orphan's load bank test "does not correlate with the data I collected during my load bank testing on the farm on December 14-16, 2010," because Mr. Orphan's data indicates that "the farm primary/secondary neutral isolation installed by Consumers Energy in 1992 has been defeated, in other words the primary and secondary neutrals re-connected, creating an artificial and invalid condition for this test." 4 Tr 321-322.

d. Data. Mr. Forster testified that, with respect tot the data recorded at the cow contact point selected by Mr. Orphan, the "large voltage excursion for the cow

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<sup>20</sup> Mr. Orphan called the test a "load bank test," but all other persons discussing the test called it a "load box test."

contact voltage was not due to Consumers Energy.” 4 Tr 325. Instead, Mr. Forster testified that they were “either a large on-farm source or an error in the monitoring system.” *Id.*

e. Other Observations.

- With respect to the primary neutral to reference rod measurements to the animal barn panel to reference rod measurements, Mr. Forster testified that “[s]ince this is an isolated farm, the barn panel voltage should be less than the primary neutral voltage.” 4 Tr 326. He noted, however, that after graphing the recordings from the 72 hour single plate test, “there are times when the barn panel voltage exceeds the primary neutral” which “suggests an on farm problem.” *Id.*

- Similarly, with respect to the primary neutral to reference rod measurements and cow contact measurements, Mr. Forster testified that, “[s]ince this is an isolated farm, the cow contact voltage should be less than the primary neutral voltage.” 4 Tr 326. However, Mr. Forster noted that “[f]or the majority of the test period the ratio between the voltages looks normal (for a NON-isolated farm, which this farm is not),” and that the “large spike in the cow contact voltage indicates an on-farm problem.” 4 Tr 327.

- With respect to the animal barn neutral and reference rod measurements to the cow contact measurements, the cow contact voltage should be less than the barn neutral voltage. 4 Tr 327. However, Mr. Forster testified that the data was inconsistent – for some of the test

period, the ratio of cow contact to barn panel was about 3 to 1 which appears normal, but at other times, the correlation does not make sense.

Mr. Forster testified that he suspected “bad wire connections or on-farm electrical system changes during the test period.” 4 Tr 328.

Overall, Mr. Forster testified that, “the numerous flaws and mistakes in Mr. Orphan’s methodology, the obvious problems with his data, his failure to properly document his testing conditions and equipment, equipment settings, and his failure to produce the raw electronic data supporting his conclusions about his testing, render all aspects of his conclusions unreliable. 4 Tr 331. He testified, “I do not believe it is possible to use Mr. Orphan’s data to make reliable conclusions with respect to testing and other requirements of the Commission Rules, I agree with Dr. Reinemann in that regard.” *Id.* Finally, Mr. Forster stated, that Mr. Orphan’s “explanations of the testing he performed did not clarify the concerns with his testing that I have noted above.” *Id.*

Finally, Mr. Forster pointed out that Mr. Thiel acknowledged in his deposition testimony that his independent testing demonstrated no preventative action levels of voltage/current at cow contact, and that his joint testing with Mr. Thiel, performed pursuant to stipulation of the parties on December 12, 2010, through December 14, 2010, also demonstrated that the preventative action level was not met or exceeded. 4 Tr 331-332, 334-336; Exhibit CE-24, p 48-50, p 40-50; Exhibit CE-25. Mr. Forster also pointed out that Consumers’ testing, conducted by Mr. Wallenwine, was conducted pursuant to Commission Rules and the data, like his data and Mr. Thiel’s data, did not reach the preventative action level, requiring no additional testing. 4 Tr 334; Exhibit CE-20 and Exhibit CE-21

C. Tensens

In support of their concern over stray voltage, Tensens rely on the testimony, testing and report of George Orphan and the testimony of Gerald R. Bodman. Gerald R. Bodman, farmer and consultant with Agricultural Systems Engineering, testified in support of Tensens' concerns over stray voltage. Mr. Bodman testified that he has performed over ten thousand farm visits in at least 27 states on various production venues. 4 Tr 348. Mr. Bodman also testified that he has been involved in field research projects to identify or develop procedures for diagnosing stray voltage complaints. 4 Tr 349. According to Mr. Bodman, "[t]his work has included developing a method to non-destructively and easily quantify the electrical integrity of electrical connections while in-place and in use, evaluation of grounding systems, and conducting extraneous voltage workshops for electricians, power supply personnel, milking system installers, producers, etc. in at least 17 states. *Id.* Mr. Bodman also testified that he has "written extensively about the phenomenon of stray voltage and its effects on animals, how to trouble-shoot suspected stray voltage problems, how to wire a farmstead to reduce the risk of stray voltage problems occurring, etc." *Id.*

Mr. Bodman reviewed the testing performed on the Tensens' Farm, including that by George Orphan, Steve Wallenwine and Fred Thiel. 4 Tr 350. Mr. Bodman also made independent observations during an on-site visit to the farm. *Id.* Mr. Bodman provided the following testimony:

1. George Orphan's Testing

In support of the testing conducted by Mr. George Orphan, Mr. Bodman testified that “despite any controversy relative to Mr. Orphan’s testing procedures, most of the results of his tests are believed to be valid.” 4 Tr 356. Mr. Bodman testified that, (1) Mr. Orphan’s reported currents in the primary system downgrounds are believed to be unreliable and that the problem appears to lie in his selection of an incorrect instrument to measure current; (2) load bank tests confirm results previously reported by Mr. Thiel, namely, that as on-farm loads increase, the voltage on the primary neutral increases to what are generally considered inappropriate levels given today’s system design technology and methods; (3) as primary neutral voltage increases, a corresponding increase in animal contact voltages occurs to levels in excess of acceptable; and (4) at high system loads and high primary neutral voltages, animal contact voltages reached 1.85 V which represents a current of 3.70 mA, when using specified 500-ohm shunt resistor or 5.1 mA when using the average resistance of the mouth-to-all-feet pathway. 4 Tr 357. Based on these “findings,” Mr. Bodman testified that: (1) “[a]nimal contact voltage and current levels exceed the 2 mA level set forth in the Public Service Commission rules when the primary system is heavily loaded,” (2) “[t]he primary neutral system is unduly sensitive to on-farm loads,” and (3) “[r]eported primary system downground currents are generally inconsistent with recorded primary neutral voltages and the reported resistance to soil of the individual grounding electrodes.” 4 Tr 358.

2. Steve Wallenwine's Testing.

Mr. Bodman criticized the testing of Steve Wallenwine. First, he testified that the SVM-10 recorder was unacceptable for a 72-hour test because when recording average

voltage during the 1-minute or 3-minute interval, “the instrument is even less capable of recording any short-term voltage surges, i.e., a voltage ‘spike’ or voltage variation.” 4 Tr 359. Thus, Mr. Bodman concludes that the device was “not capable of giving a true and accurate picture of the electrical events affecting a farm, especially when set to record over a long period of time.” 4 Tr 364. Second, he testified that the data of Mr. Wallenwine demonstrates the “secondary system voltage responded to voltage changes on the primary system at least six times during the test interval” but that the “variations and correlations were not noted in Mr. Wallenwine’s written commentary.” 4 Tr 360. Third, Mr. Bodman testified that “the voltage in the areas selected by Mr. Wallenwine for his reference rod would be elevated relative to a true ‘remote’ location,” and “the difference in voltage measured between this reference rod and the various points monitored, including the primary neutral, would be artificially reduced.” 4 Tr 361; 4 Tr 364. He also criticizes Mr. Wallenwine because the “location selected by Mr. Wallenwine is also contrary to the 50 ft. minimum distance set forth in the Michigan Public Service Commission rules and regulations governing voltage investigations.” *Id.* Fourth, Mr. Bodman questioned Mr. Wallenwine’s conclusion that the increase in voltage on August 21<sup>st</sup> was due to an on-farm load. Mr. Bodman concluded that, “[a] more probable reason for the marked increase in voltages on the secondary system on August 21<sup>st</sup> is a ‘momentary’ failure or closure of the isolation device at the dairy center transformer pole.” He concluded that these increases were “most probably due to short-term failure of the isolation device, via carbon tracking, which resulted in coupling of the primary and secondary system at the dairy facility service. 4 Tr 363; 4 Tr 364. Finally, he testified that the ‘several-times-per-day increase in voltage on the secondary

system as the primary neutral voltage increased is most probably due to the interconnection of the primary and secondary neutrals at the second service on the farm, i.e., at the grain storage and irrigation well site. 4 Tr 364.

Overall, Mr. Bodman concluded that stray voltage levels exist on the Tensens' Farm in excess of 1 volt and that the predominant source of extraneous voltage and current on the Farm is the primary neutral system of Consumers Energy. 4 Tr 351. He, like Mr. Orphan, made recommendations for modifications to reduce stray voltage. 4 Tr 353-356.

#### **IV.**

#### **ANALYSIS AND FINDINGS**

##### **A. Jurisdiction**

Sometime between the testing conducted by Mr. George Orphan and that of Charles Forster, Tensens allege that “work” was “performed on the lines serving the farm.” Tensens Initial Brief, p 5. Thus, Tensens state “the Petitioners do not dispute for purposes of this proceeding that the farm is not currently subject to stray voltage.” *Id.* In fact, they affirmatively state that “[w]e agree that the testing by both parties shows no PRESENT stray voltage issue . . . “ *Id.* at 6. With that, Tensens argue that “there is no current issue that can be ruled upon and therefore no remedy can be issued” and that the “Commission has no authority to address past actions – only ongoing problems.” *Id.* at 6. Thus, Tensens request that the “Commission should rule that because there is no ongoing stray voltage, that the case should be closed with no other finding as to past actions.” *Id.*



This ALJ disagrees with Tensens' assertion that the Commission is without jurisdiction to address past actions of Consumers. As set forth in *Union Carbide Corp v Public Service Commission*, 431 Mich 135, 146; 428 NW2d 322 (1988), "[t]he commission is a creature of the Legislature and, as such, possesses only those powers conferred upon it by statute." *Id* (citations omitted). In this case, Michigan statutes grant the MPSC the power and authority to regulate public utilities, such as Consumers. Michigan Public Act 1939, No. 3, specifically governs the Public Service Commission and grants the Public Service Commission general powers and jurisdiction. According to the preamble of PA 1939, No. 3, the act was established "to provide for the regulation and control of public utilities and other services affected with a public interest within this state . . . ." MCL 460.6 vests the Commission with "complete power and jurisdiction to regulate all public utilities in the state . . . ." and vests the Commission "with power and jurisdiction to regulate all rates, fares, fees, charges, services, rules, conditions of service, and all other matters pertaining to the formation, operation, or direction of public utilities." Additionally, MCL 460.6 grants the Commission the "power and jurisdiction to hear and pass upon all matters pertaining to, necessary or incident to the regulation of public utilities, including electric light and power companies . . . ." (emphasis added). There is no language in the statute that limits the grant of jurisdiction and authority prospectively only.

Having a general grant of jurisdiction and authority to regulate public utilities such as Consumers, MCL 460.55 goes on to grant the Commission the specific authority and/or power to "make, adopt and enforce rules and regulations for the conduct of its business and the proper discharge of its functions hereunder, and all

persons dealing with the commission or interested in any matter or proceeding pending before it shall be bound by such rules and regulation.” MCL 460.55 continues by saying the Commission “shall also have authority to make and prescribe regulations for the conducting of the business of public utilities, subject the jurisdiction thereof, and it shall be the duty of every corporation . . . to obey such rules and regulations.”

One of the sets of rules and regulations promulgated by the Commission in the discharge the authority granted above is the Public Service Commission Rules and Regulations Governing Animal Contact Current Mitigation found at R 460.2701 et seq. This set of rules and regulations provides the Commission with the power and authority to direct a specific remedy in matters such as the one at issue in this matter. R 460.2706 of the Public Service Commission Rules and Regulations Governing Animal Contact Current Mitigation provides, in relevant part,

- (1) After completing the procedures described in R. 460.2702 to R 260.2705, if a complainant of a utility claims to have animals that have experienced behavior or production problems due to animal contact current caused by a utility’s distribution system, then the complainant may file a formal complaint and request a contested case hearing before the commission to resolve the dispute. In accordance with the rules and procedures for contested cases, the commission shall consider facts and evidence to determine the following:
  - (a) Whether the utility's supply of electricity or electrical service is causing animal contact voltage or current of sufficient magnitude and duration to result in behavior or production problems.
  - (b) Whether the utility has taken reasonable steps to avoid or mitigate any animal contact current.
  - (c) Whether the claims or defenses are supported by valid scientific research and prevailing scientific opinion.

- (d) Other findings the Commission deems necessary and relevant.
- (2) If a decision is favorable to the complainant, then the utility shall determine the manner and nature of any necessary modifications or corrections to its facilities, as approved by the commission.
- (3) If a decision is favorable to the utility, then further action by the utility is not required.

Thus, the Commission has the power and authority to direct a utility to fashion a modification or correction to Consumers' facilities to mitigate any stray voltage problems.

The Tensens now contend that any stray voltage problems that once existed have ceased, leaving no matter for the Commission to address. Despite this position, this ALJ notes that tens of thousands of dollars were spent by the Commission and the parties in this matter addressing the Tensens concerns. This includes fees expended for the purpose of paying experts to evaluate all aspects of the farm as well as the primary and secondary electrical systems of the farm and Consumers. Because the Commission is charged with assuring that utilities conduct business in a manner that follows the statutes, rules and regulations, it is important to determine whether or not, throughout the process, there is evidence that Consumers acted in a manner consistent with that required under the Rules and Regulations Governing Animal Contact Current Mitigation. This ALJ further finds it necessary to address and analyze whether or not the Rules regarding stray voltage were adhered to by the utility, as penalties outside of the confines of these administrative proceedings may be explored and the findings in these proceedings may become relevant thereto.

B. Stray Voltage Rules and Regulations

Complaints regarding stray voltage are governed by R 460.2701 et seq.

1. Initial Request for Investigation

According to R 460.2702(1), the first step in any stray voltage case is as follows:

(1) A utility shall respond to a request for investigation and work with the complainant to conduct an initial investigation to determine stray voltage levels. If resolution is not met, the complainant may request further investigation as provided for in this rule.

Testimony of Peter J. Derkos of the MPSC indicates that the PSC was contacted by Tensens on or about March 20, 2008 with concerns regarding stray voltage. 4 Tr 272. Consumers' Steven L. Wallenwine contacted the Tensens on March 21, 2008 and set up an appointment to meet with them on March 24, 2008. 4 Tr 296; 4 Tr 273. At that time, Consumers' testing of the neutral separation was good and found to be effective and conducted some short duration voltage measurements. 4 Tr 296-297; 4 Tr 273. Because no problems were found, no further action was taken. It should be noted that separation of neutrals was installed on August 19, 1992, and rechecked on 4/18/96, 3/23/99, 2/29/00, 9/6/01, 6/17/02, 8/26/03, 7/6/04, 8/29/05 and 4/19/07 and found to be effective. 4 Tr 300. Consumers did not find any voltage levels of concern in these "spot checks." Thus, no further action was taken at that time.

The facts set forth above are not in dispute and this ALJ finds that Consumers complied with the requirements set forth in R 460.2702(1). Additionally, while it was noted in testimony that Tensens were not satisfied with the results of the results of Consumers' testing, this ALJ finds that, pursuant to the rules and regulations, the results

of the stray voltage measurement taken by Consumers warranted no further action by Consumers at that time.

## 2. Second Request for Investigation

According to R 460.2702(2), if a party is not satisfied with the results of testing conducted pursuant to R 460.2702(1), the second step in a stray voltage case is as follows:

(2) Upon conclusion of (1) and upon request of the complainant, a utility shall conduct an investigation of each complainant inquiry or complaint concerning animal contact current or voltage, commonly referred to as stray voltage. The following shall apply:

(a) The level of animal contact current shall be determined from Measurements of animal contact voltage using Ohm's Law. The voltage measurement shall be made between 2 points, which an animal can simultaneously contact and under which animal contact voltage is most likely to occur. When measuring from the floor or earth, a single metallic plate with an area of 12 to 16 square inches shall be used to simulate the foot of the animal. One lead of the measuring instrument shall be connected to the plate, which shall be placed on the floor or earth where an animal may stand. The other lead of the measuring instrument shall be connected to a conductive object that an animal could reasonably contact while 1 of its feet is at the location of the plate. For all measurements of animal contact voltage a shunt resistor shall be used to simulate the resistance of the animal. A suitable material, such as a medical grade electrode contact gel, shall be used to simulate real conditions and maintain conductivity to the floor or earth for the duration of the testing period.

(b) An approved method for determining the utility contribution to the animal contact current is contained in R 460.2707, Protocol to Evaluate Utility Contribution to Animal Contact Current.

Several months after Consumers' "spot check," Tensens, who were dissatisfied with the results, requested a further investigation pursuant to R 460.2702(2). Mr.

Steven L. Wallenwine contacted the Tensens and scheduled August 19 through 22, 2008, as the days to conduct more thorough testing. The testing included the 72 hour test set forth in the rules regarding protocol for testing for stray voltage (R 460.2707). In addition to Mr. Wallenwine's crew, Mr. Tensen, Dr. Don Hillman, and George Orphan were present for the testing. 4 Tr 301. Neither Mr. Tensen nor Dr. Hillman presented testimony in this case which challenge the manner of testing conducted by Consumers based on their personal observations. Mr. Orphan conducted his own testing, but presented no testimony challenging or otherwise refuting the manner of testing or the test results of Consumers.

The only person who criticized the testing done by Consumers in August, 2008, was Gerald R. Bodman. Mr. Bodman was not present at the time any testing was conducted, but based his opinion on a review of the test results after a contested case was commenced. Primarily, Mr. Bodman criticized Mr. Wallenwine's testing based on the instrumentation used by Consumers and the location of his reference ground rod. 4 Tr 352, 358-364. Mr. Bodman does not appear to have performed his own independent testing and did not attempt to recreate the testing of Consumers to confirm what were largely his suspicions regarding the reasons for the results obtained by Consumers. Mr. Bodman's conclusions are cloaked in language of "most probably due to . . . " and were not based on his independent testing or observations of the testing conducted by Consumers.

The Rules define "preventative action level" as "a steady state animal contact current that meets or exceeds 2 milliamperes RMS using a nominal 500 ohms resistor at 60 Hz from all sources, including off-premises and on-premises sources." R

460.2701 (n). This ALJ agrees with Staff and Consumers that Mr. Wallenwine's 72-hour testing revealed animal contact voltage no higher than 0.58 volts, which does not meet or exceed the preventative action level set forth in the Rules. Thus, this ALJ finds that no additional testing was required of Consumers at that time and no further action (including mitigation) was required of Consumers at that time.

### 3. Mitigation

According to R 460.2702(3), the third step in any stray voltage case deals with mitigation. R 460.2703 defines the action required to mitigate animal contact.

(1) If the steady state animal contact current from all sources as measured by the utility in accordance with this rule meets or exceeds the preventive action level, and if the utility contribution exceeds 1 milliamper RMS, then the utility shall commence action within 2 business days, or at a mutually agreed upon timeframe between the complainant and the utility, to reduce the utility contribution to 1 milliamper or less.

(2) If a utility is required to take action, then the utility shall make modifications or corrections to its facilities in accordance with the standards and codes approved by the commission.

(3) If the utility determines that some or all of the utility contribution is carried through a communication service provider's facilities, then the communication service provider shall eliminate the communication service system as a pathway for animal contact current from the utility's system within the time limit described in subrule (1) of this rule. For any disagreement between the utility and the communication service provider under this subrule, either party may seek a resolution from the commission.

This ALJ again agrees with Staff that when Consumers determined that the preventative action level had not been met or exceeded, Consumers was not required to conduct any further testing or take any further steps toward mitigation. R 460.2702 and R 460.2703 are 2-prongs of the test to determine if stray voltage is a problem and how to mitigate the same. When the testing under R 460.2702 revealed that the

preventative action level had not been met, the second prong, R 260.2703, which involves a determination of the utility's contribution to any voltage that meets or exceeds the preventative action level, was not necessary.

That being said, although not required to do so because the preventative action level had not been established, Consumers took the extra initiative and conducted a load-box test to determine Consumers' contribution to that 0.58 volts revealed through its 72-hour testing. That test was not initially conducted, but was conducted on December 14-16, 2010, when Mr. Forster and Mr. Thiel performed joint tests pursuant to the stipulation of the parties. Again, the protocol for determining the utility's contribution to animal contact current is described in R 460.2707. If that test indicated that Consumers contributed more than 1 milliamp to animal contact current, they would be required to take action pursuant to Rule 3 (R 460.2703) of the stray voltage rules.

This ALJ agrees with Staff and Consumers that the load box test was not necessary as the preventative action level for animal contact current had not been met. This ALJ further agrees with Staff and Consumers that the results of the load box test demonstrated that Consumers' contribution did not exceed 1 milliamp, thus requiring no mitigation action on the part of Consumers.

#### 4. Appointment of Experts and Further Investigation

According to R 460.2704 and R 460.2705, if either the complainant or the company is not satisfied with the results of the testing conducted pursuant to R 460.2702 (and R 460.2703 regarding mitigation); either can request further investigation as follows:

R 460.2704 Request for Investigation



- (1) After completion of the procedures in R 460.2702 and R 460.2703, a complainant or the utility may request, with notification to the other party, that the commission appoint at least 3 and up to 5 experts to investigate in the manner in R 460.2705. If the commission appoints at least 3 and up to 5 experts, those experts shall have the rights and responsibilities as described in that rule and shall issue their investigation report and conclusions to the commission, the complainant, and the utility.
- (2) The funding mechanisms in R 460.2705 shall be used to defray the costs of the experts as determined by the commission.

R 460.2705 Appointment of experts.

(1) If a complainant or the utility requests an investigation through the commission under R 460.2704 of these rules, then the commission may appoint at least 3 and up to 5 experts to investigate the complaint and report findings to the commission within the scope of these rules. The commission shall consider expert individuals based on, but not limited to, all of the following criteria:

- (a) Expertise specific to the specie affected.
- (b) Objectivity - individuals not directly impacted by the resolution.
- (c) Neutral third-party.
- (d) Training and expertise in primary distribution systems and certification in secondary wiring systems.

(2) The experts shall limit their conclusions and reports to the subject of the dispute and the facts and circumstances of the specific case for which they were appointed.

(3) Either party may request specific disciplines be represented on the expert team.

(4) The experts shall submit a report to the commission with the results and conclusions of their inquiry, which may suggest corrective measures for resolving the complaint. The reports of the experts shall be received in evidence and the experts shall be made available for cross-examination by the parties at any hearing. The experts shall report to the commission within 30 days of their employ. The commission may grant up to a 30-day extension.

(5) The reasonable expenses of experts, including a reasonable hourly fee or fee determined by the commission, shall be submitted to the

commission for approval and, if approved, shall be funded under subrule (6) of this rule.

(6)The utility shall reimburse the experts appointed by the commission for the reasonable expenses incurred in the course of investigating the complaint.

Again, when the Tensens were not satisfied with the results of the 72-hour tests and load box tests conducted by Consumers, they requested the Commission appoint a panel to investigate their claims. The Commission appointed Dr. Roger Mellenberger, Dr. Pamela L. Ruegg, James H. Worden, Dr. Douglas J. Reinemann, and George J. Orphan. All of the experts except George Orphan found that on-farm electrical non-compliance, on-farm contribution, and problematic farm management techniques were at the core of the problems experienced by the Tensens. Mr. Orphan stood alone as the panel member who insisted that stray voltage was the source of the farm's production problems. However, it is noteworthy that Mr. Orphan failed and/or refused to invite any other parties, panelists or other experts to participate in or observe his testing. He also made no reference to his conformance with protocol and made no finding relative to the preventative action level required by the Stray Voltage Rules in his report. Dr. Reinemann soundly criticized Mr. Orphan's competence and firmly asserts that Mr. Orphan's test results are unreliable for a variety of reasons set forth above. Staff has also questioned the test results of Mr. Orphan and, similarly, finds them to be unreliable. This was supported by Mr. Forster.

This ALJ agrees with the criticism lodged against Mr. Orphan based on the testimony presented in this matter and finds that Mr. Orphan's testing did not follow protocol, is unreliable, and does not demonstrate that animal contact current met or exceeded the preventative action level required by the Stray Voltage Rules. As an

additional matter, this ALJ finds that Mr. Orphan was an inappropriate choice as a panelist in this matter and that Tensens' pursuit of him as a panelist was inappropriate.<sup>21</sup> His failure to disclose his previous (and very recent) business relationship with the Tensens, which involved his representation of them for the purposes of finding stray voltage problems (for which he was paid and considered them clients), calls his motivations and opinions into serious question in this matter. It is this ALJ's opinion that Mr. Orphan should have disclosed that relationship, particularly in light of the fact that the Tensens so vehemently pursued his appointment at the Commission level. It is this ALJ's opinion that while Mr. Orphan did his best in attempting to do the testing in this matter, he was not the most qualified to do so and, for all the reasons set forth in testimony, his test result are not reliable.

#### 5. Contested Case Hearing

The final step in pursuing a stray voltage claim involves the request for a contested case hearing. R 460.2706 provides:

(1) After completing the procedures described in R 460.2702 to R 460.2705, if a complainant of a utility claims to have animals that have experienced behavior or production problems due to animal contact current caused by a utility's distribution system, then the complainant may file a formal complaint and request a contested case hearing before the commission to resolve the dispute. In accordance with the rules and procedures for contested cases, the commission shall consider facts and evidence to determine the following:

(a) Whether the utility's supply of electricity or electrical service is causing animal contact voltage or current of sufficient magnitude and duration to result in behavior or production problems.

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<sup>21</sup> . This ALJ finds it ironic that Tensens accused the Commission of tipping the panel in the favor of the utility, when they were, in fact, the ones who were pursuing the appointment of a panelist who was already pursuing their interest.

(b) Whether the utility has taken reasonable steps to avoid or mitigate any animal contact current.

(c) Whether the claims or defenses are supported by valid scientific research and prevailing scientific opinion.

(d) Other findings the Commission deems necessary and relevant.

(2) If a decision is favorable to the complainant, then the utility shall determine the manner and nature of any necessary modifications or corrections to its facilities, as approved by the commission.

(3) If a decision is favorable to the utility, then further action by the utility is not required.

Based on the testimony and evidence in this case, this ALJ finds as follows:

1. Consumers' supply of electricity or electrical service is not the cause of any alleged behavior or production problems on the Tensens farm. The great majority of evidence in this matter suggests that on-farm electrical problems and non-compliance along with farm management problems were issues of significant concern on the farm;
2. Consumers was not required to take any remedial actions to avoid or mitigate animal contact current as the preventative action level for animal contact current was not met or exceeded and behavior of the livestock at issue were all attributed to matters related to condition of the dairy cows and farm management. Any actions taken by Consumers to act on the suggestions of the Tensens were voluntary and not required under the Rules for mitigation of animal contact current; and

3. The claims of the Tensens were unsupported by scientific testing and that the existence of problems outside electric current, including farm management, were scientifically supported.

## V.

### CONCLUSION

Based upon the foregoing, this ALJ recommend that the Commission issue an order in favor of Consumers finding that:

1. The claims of the Tensens are unsupported by scientific testing;
2. All reliable testing conducted demonstrated that the preventative action levels for animal contact current were not met or exceeded on the Tensen Farm;
3. Consumers was not required to take any remedial action or otherwise mitigate any contribution to animal contact current as the same did not meet or exceed the preventative action level set forth in the Stray Voltage Rules;
4. The existence of problems outside of electric current, including on-farm electrical problems, electrical code non-compliance, health condition of the dairy herd, and farm management, were significant on the Tensen Farm and contributed largely to the problems experienced by the Tensens; and
5. Tensens acknowledge that no stray voltage problem currently exists on Tensen Farm, thus requiring no further consideration by this Commission or mitigation action on the part of Consumers.

MICHIGAN ADMINISTRATIVE HEARING  
SYSTEM  
For the Michigan Public Service Commission

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Theresa A. Sheets  
Administrative Law Judge

ISSUED AND SERVED: October 17, 2011  
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